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BRACHYMETOPUS McCOY (TRILOBITA) IN THE CARBONIFEROUS OF POLAND AND U.S.S.R.

Abstract. — Several Carboniferous representatives of *Brachymetopus* McCoy are described from Poland and U.S.S.R. They are: *B. maccoyi maccoyi* (Portlock, 1843), *B. weberi* n. sp., *B. ouralicus sanctacrucensis* n. subsp., *B. moelleri parvus* n. subsp., *Brachymetopus* n. sp. and *?Brachymetopus* sp. The widely distributed species *B. ouralicus* (de Verneuil, 1845) is revised.

INTRODUCTION

The present paper deals with the some representatives of the genus *Brachymetopus* McCoy from the Carboniferous of Eastern Europe and parts of Asia.

The material mainly consists of the specimens collected by the present writer in the Viséan Limestone (D_2) of Gałęzice, Holy Cross Mountains (Góry Świętokrzyskie), Poland. She had also at her disposal a collection described by Jarosz (1909) from the Tournaisian of the Racławka valley, Cracow region, Poland. During her stay in U.S.S.R. in 1967, on a grant given by the Polish Academy of Sciences, the present author had the opportunity to investigate some representatives of *Brachymetopus* from the Lower and Upper Carboniferous deposits of the Donetz Basin, Vaigatch Island, the Urals, Khirgiz Steppe and the Altai, previously described by Moeller (1867) and Weber (1933, 1937). Those specimens are housed in the Tshernyshev's Museum, Leningrad.

Investigating this material, it was possible to make some corrections of the previous determinations to give a comparatively complete picture of the distribution of so far known *Brachymetopus* species in Eastern Europe and parts of Asia.

Among the here described and revised Carboniferous representatives of *Brachymetopus*, there is one — *B. maccoyi maccoyi* (Portlock, 1843) known throughout the whole of Europe, being found in Great Britain, Germany, Poland and the Urals. This subspecies is known from the lower

part of the Carboniferous, not higher than Lower Viséan. The other subspecies of *B. maccoyi* are as far known only from Germany, where the species was recently revised (Hahn, 1964).

The other widely distributed Carboniferous species of *Brachymetopus* is *B. ouralicus* (de Verneuil, 1845). This species is, however, more variable than the former, and four subspecies are differentiated within it, from across Europe. All are found, with one questionable exception, in Viséan deposits. They are: *B. ouralicus ouralicus* (de Verneuil, 1845), from the Urals, Donetz Basin, Turkestan (USSR), *B. ouralicus inflatus* Weber, 1937, from the Urals (USSR), *B. ouralicus sanctacrucensis* n. subsp., from the Holy Cross Mountains (Poland), and *B. ouralicus ornatus* Woodward, 1884, from Eire and Great Britain.

Brachymetopus moelleri Weber, 1937 was known from the Upper Carboniferous of the Urals, where its nominate subspecies occurs, and was recently described also from the "*Pericyclus*-Stufe" of Thuringia, Germany, as its subspecies *B. moelleri thuringensis* Hahn, 1964. The here described new subspecies from the Viséan (D_2) of the Holy Cross Mountains — *B. moelleri parvus* n. subsp. — fills the geographic and stratigraphic gap between them.

The form described by Weber (1937) from the Vaigatch Island as "*Brachymetopus moelleri(?)* nom. nov.", is here assigned by the present author to a new species *Brachymetopus weberi* n. sp.

In Weber's collection occurs a very peculiar, damaged cephalon from the Tournaisian of the Altai (USSR), which though it cannot become a holotype of a valid species, certainly represents a new form and is here described and illustrated as *Brachymetopus* n. sp.

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The photographs are made by Miss M. Czarnocka (Palaeozoological Institute, Polish Academy of Sciences, Warsaw) and by the present author.

Abbreviations used:

Z. Pal. — Palaeozoological Institute, Polish Academy of Sciences, Warsaw. Poland.

ZNG Kr. O. — Laboratory of Geology, Institute of Geological Sciences, Polish Academy of Sciences, Cracow, Poland.

TML — Centralnyj naučno-issledov. geol.-razved. Muzej im. akad. F. N. Černyševa, Leningrad, USSR.

DESCRIPTIONS

Family **Brachymetopidae** Prantl & Přibyl, 1950
Genus *Brachymetopus* McCoy, 1847, emend. Hahn, 1964
Brachymetopus maccoyi maccoyi (Portlock, 1843)
(Pl. II, Figs. 1, 6)

1964. *Brachymetopus maccoyi maccoyi* (Portlock); G. Hahn, Revision..., p. 154, Pl. 20, Figs. 9,10 (*with earlier synonymy*).

Material. — One internal mould of cephalon, 3 pygidia with exoskeleton partly preserved, from light-grey Tournaisian limestone of the Racławka river valley, Cracow region, Poland.

Dimensions (in mm):

	ZNG Kr.O.2	ZNG Kr. O.2
Length of cephalon . . .	4.3	—
Width of cephalon . . .	6.8	—
Length of glabella . . .	2.0	—
Width of glabella . . .	1.9	—
Length of pygidium . . .	—	7.0
Width of pygidium . . .	—	9.5
Length of axis	—	5.2
Width of axis	—	2.8

Remarks. — The cephalon of the Polish specimens of *B. maccoyi maccoyi* (Portlock) differs from the holotype in having a slightly less triangular shape and a border not so distinctly differentiated. Glabella seems to be slightly shorter and more triangular. However, at least some of these differences can be due to the fact that the cephalon from the Racławka valley is preserved as the internal mould. Pygidium found in the same locality is very similar to this illustrated by Hahn (1964, Pl. 20, Fig. 10) and has 9 ribs and about 18 rings. In comparison with the specimens from the Urals, the Polish ones show the same differences as those mentioned above.

Brachymetopus ouralicus (de Verneuil, 1845)

Subspecies assigned: B. ouralicus ouralicus (de Verneuil, 1845), *B. ouralicus ornatus* Woodward, 1884, *B. ouralicus inflatus* Weber, 1937, *B. ouralicus sanctacrucensis* n. subsp.

Remarks. — The species was established by de Verneuil (1845) on the pygidium, while the cephalon was still unknown. The cephalon assigned to this species was later described by Woodward (1884). It was found together with the pygidia which were very similar to the pygidium described by de Verneuil (1845).

In 1933 Weber described from the Carboniferous of the Donetz Basin a cephalon, which he named "*Brachymetopus densituberculatus*". This cephalon differs from those illustrated by Woodward (1884, Pl. 8, Figs. 1-5) in having a more dense granulation and also being more rounded anteriorly. Later on, Weber (1937) recorded from the Viséan deposits of the Urals a cephalon identical with this from the Donetz Basin, which was associated with the pygidia of *B. ouralicus* (de Verneuil). Thus, he included his "*B. densituberculatus*" into the synonymy of *B. ouralicus* (de Verneuil).

The present author, comparing the English and Ural specimens, stated, that though the differences between the pygidia of these species are slight, those between the cephala are much more significant (see Table 1). In her opinion, these two forms should be assigned to two

Table 1

Comparison between the subspecies of *Brachymetopus ouralicus* (de Verneuil, 1845)

	ouralicus	*ornatus*	*inflatus*	*sanctacrucensis*
Outline of cephalon	rounded	subtriangular	—	subtriangular
Anterior margin of cephalon	horizontal	raised	—	upturned
Preaxial field in its part adjoining glabella	gently sloping	gently sloping	—	steeply sloping
Ornamentation of cephalon	dense, tubercles elongate, inclined backwards, before glabella not larger than others	comparatively scarce, tubercles rounded, larger before eyes and glabella	—	dense, tubercles pointed, before eyes and glabella larger
Outline of pygidium	subtriangular, elongate posteriorly	elongate, broadly rounded posteriorly	rounded posteriorly	broad, subsemicircular
Pygidial margin	somewhat concave	distinctly concave	conv x	distinctly concave
Axis	20 and more rings	about 17 rings	18 rings, broad at front	about 20 rings
Ornamentation of pygidium	dense, irregular, margin densely granulated	comparatively sparse, regular, on margin tubercles only in prolongation of ribs	dense	dense, regular, tubercles in prolongation of ribs

separate subspecies of *B. ouralicus*. Therefore, the nominate species is that from the Urals (and Donetz Basin), while the Irish and British specimens should retain the name *Brachymetopus ouralicus ornatus*, proposed as an alternative by Woodward (1884, p. 52).

Among the "varietates" of *Brachymetopus ouralicus* described by Weber (1937), only *B. ouralicus inflatus* Weber, 1937 can be easily recognized when found in the future. The other two: "*B. ouralicus* var. *saggitifera*" (1937, p. 83, Pl. 10, Fig. 8) and "*B. ouralicus* var. *paucituberculata*" (1937, p. 83, Pl. 10, Fig. 9) — each one based on a small, single fragment of pygidium, are practically unrecognizable [1], thus are not included into the present revision of this species.

Geographic and stratigraphic range. — Viséan — ?Namurian of Eire, Great Britain, Poland, USSR (Urals, Donetz Basin).

Brachymetopus ouralicus ouralicus (de Verneuil, 1845)
(Pl. I, Figs. 6,7; Text-Pl. I, Fig. 5)

Neotype: Pygidium (TML No. 2022/5107); Weber, 1937, Pl. 10, Fig. 4; our Pl. I, Fig. 6.
Type locality: Shartymka river, South Urals, USSR.
Type horizon: Viséan, Lower Carboniferous.

Diagnosis. — Cephalon broadly rounded frontally, with short genal spines, no marked border; preglabellar region as long as the length of glabella, including the occipital ring; pygidium elongate posteriorly, subtriangular; axis narrow, with more than 20 rings; pygidial margin concave; ornamentation of exoskeleton very dense; along the middle line of pygidial axis, a row of larger tubercles, situated on every third ring.

Remarks. — To the present author's knowledge, the original of de Verneuil's "*Phillipsia ouralica*" is lost. The locality "Kozatchia Datcha, Urals", given by de Verneuil for the original, according to Weber (1937, p. 84) is most probably identical with the locality of the Shartymka river, where the latter author found the specimen chosen here for the neotype.

Stratigraphic and geographic range. — Viséan of USSR: Urals, Donetz Basin, Turkestan (here may be also in Lower Namurian).

Brachymetopus ouralicus ornatus Woodward, 1884

Lectotype: Cephalon; Woodward, 1884, Pl. 8, Fig. 1.
Type locality: Settle, Yorkshire, England.
Type horizon: Viséan, Lower Carboniferous.

Diagnosis. — Cephalon subtriangular, with slightly differentiated, raised border; preglabellar field somewhat shorter than glabella with

[1] The same is true for "*Brachymetopus arenaceus*" (Weber, 1937, p. 85, Pl. 10, Fig. 20).

occipital ring; pygidium broadly rounded posteriorly, axis broad at front, narrowing rapidly backwards, with about 17 rings; ornamentation of exoskeleton moderately dense, with several tubercles before glabella distinctly larger than the others.

Remarks. — This subspecies differs from *B. ouralicus ouralicus* (de Verneuil, 1845) in having a scarcer tuberculation of exoskeleton, the tubercles adjoining the preglabeller furrow being larger than the others. The anterior outline of the cephalon in *Brachymetopus ouralicus ornatus* Woodward, 1884 is slightly pointed, subtriangular, while in the nominate subspecies it is broadly rounded. On the contrary, the outline of the pygidium is in *B. ouralicus ornatus* broad posteriorly, while it is in the compared subspecies more elongate and subtriangular. Also the axis in the British subspecies is shorter, having 17 rings, with the larger tubercles along the medial line lacking.

The name "*Brachymetopus ornatus*" was alternatively proposed by Woodward (1884, p. 52) for the British and Irish specimens, described by the latter on p. 48 (1884), should they turn out to be different from the Ural form. This name is adopted in the present paper as a subspecific one, because the considered forms though different, are very close to each other. Both have short genal spines and the same shape of glabella, as well as a gently sloping preglabellar region.

Stratigraphic and geographic range. — Viséan of Great Britain and Eire.

Brachymetopus ouralicus inflatus Weber, 1937

Holotype: Pygidium (TML No. 2060/5107); Weber, 1937, Pl. 10, Fig. 7.
Type locality: Karagaila river, South Urals, USSR.
Type horizon: Viséan, Lower Carboniferous.

Diagnosis. — Pygidium rounded posteriorly, vaulted longitudinally and transversely; pygidial border convex; axis at front as broad as pleural lobe (*tr.*), strongly narrowing posteriorly, with about 18 rings; ornamentation dense, larger tubercles along the middle line of axis, on every third ring.

Remarks. — Only the pygidium of this subspecies is known. The Weber's collection includes another pygidium from the same horizon and locality (TML No. 2024/5107), which was assigned by that author within *B. ouralicus ouralicus* (1937, p. 82, Pl. 10, Fig. 6). However, in the present author's opinion, it should be assigned within *B. ouralicus inflatus,* as it exposes the same, characteristic longitudinal and transverse vaulting, absent in the other subspecies of *B. ouralicus.* The insignificant differences between both considered pygidia may be due to the fact that the pygidium in question (Pl. 10, Fig. 6) is smaller.

Stratigraphic and geographic range. — Type horizon and type locality.

Brachymetopus ouralicus sanctacrucensis n. subsp.
(Pl. I, Figs. 1-5; Text-Pl. I, Figs. 1, 4)

Holotype: Cephalon (Z. Pal. No. Tr. II/153); Pl. I, Fig. 3.
Type locality: Besówka Hill, Gałęzice, Holy Cross Mountains, Poland.
Type horizon: D_2 Viséan, Lower Carboniferous.
Derivation of the name. Lat. *sanctacrucensis* — coming from the Holy Cross Mountains.

Diagnosis. — Cephalon subtriangular with raised border; preglabellar field somewhat shorter than the length of glabella with occipital ring; pygidium broad, rounded posteriorly, with concave margin; axis narrow at front, only weakly narrowing posteriorly; ornamentation very dense, with larger tubercles before glabella and along the middle line of the pygidial axis.

Material. — One nearly entire cephalon, abundant external moulds of cephala, 6 pygidia, from light limestone of Besówka Hill, Gałęzice.

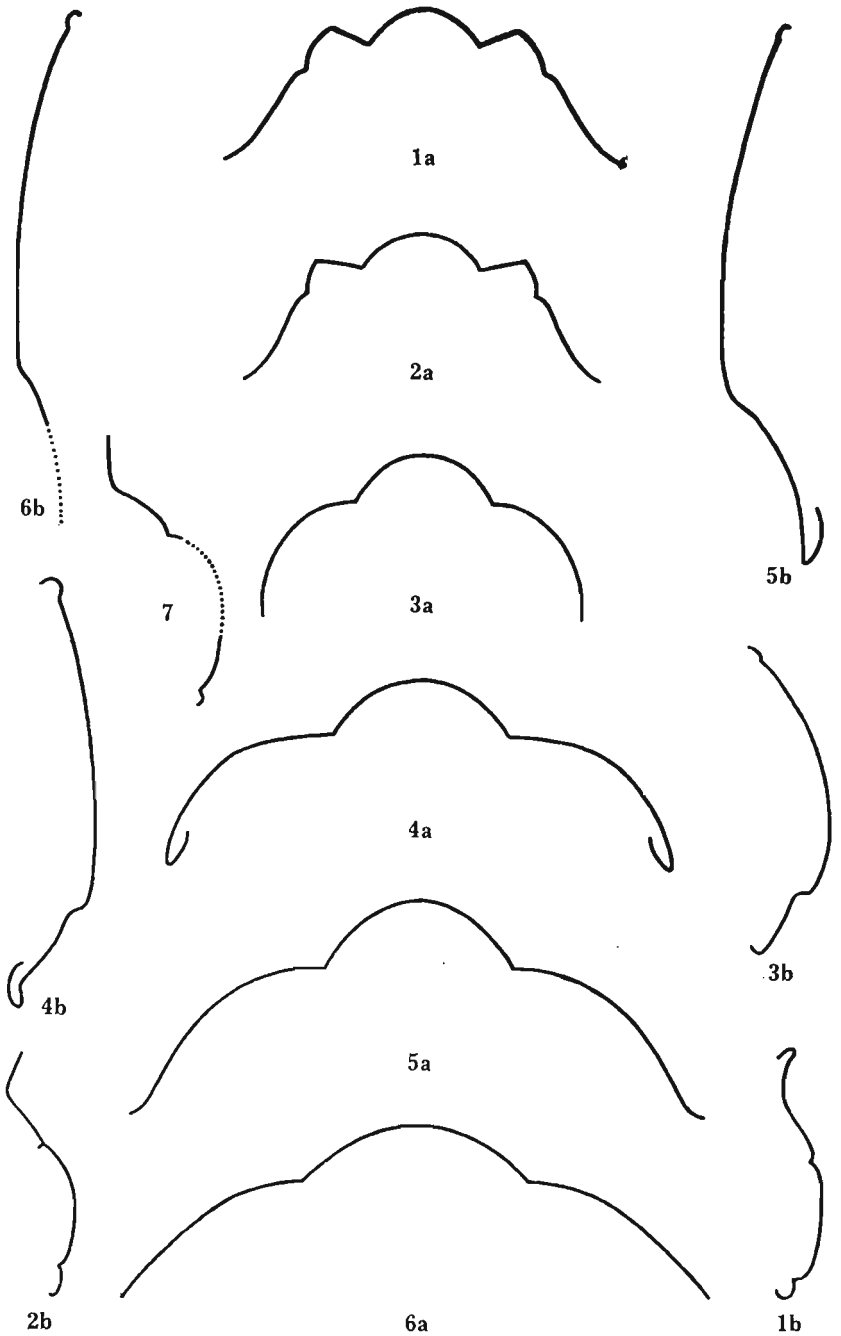
Dimensions (in mm):

	Z. Pal. No. Tr. II/			
	153	38	108	150a
Length of cephalon	5.5	—	—	—
Width of cephalon	(?) 9.0	—	—	—
Length of glabella	2.6	—	—	—
Width of glabella	2.1	—	—	—
Length of pygidium	—	4.0	7.8	13.0
Width of pygidium	—	4.9	9.8	18.6
Length of axis . .	—	3.0	5.9	9.9
Width of axis. . .	—	2.0	3.0	4.0

Description. — Cephalon subtriangular, gently rounded frontally, with short genal spines; margin of cephalon distinctly upturned; glabella less than half of the length of cephalon, subtriangular; basal lobe triangular, distinctly pronounced; S_2 very faintly marked; occipital ring narrow (*sag.*), longer (*tr.*) than the width of glabella at its base; eye longer than half the length of glabella, with broad (*tr.*), steeply raised palpebral lobe and convex (transversely and longitudinally) visual lobe, which faces dorso-laterally and antero-posteriorly; central part of cephalon very highly elevated.

In longitudinal section, cephalon very steeply sloping from the middle of glabella, to about half the width (*sag.*) of preglabellar region, the latter marginally somewhat upturned.

TEXT-PLATE I



In transverse section, cephalon very highly vaulted, glabella with steep sides, axial furrows in deep depressions, eyes very high, somewhat higher than glabella, librigena sloping at nearly 45° towards the narrow, horizontally placed marginal part.

Hypostoma and thorax unknown.

Pygidium somewhat elongate backwards, surrounded by a slightly upturned margin; axis long and narrow, with more than 18 well separated rings; ring-furrows broad and straight; 8-9 convex ribs separated by comparatively broad and deep pleural furrows; interpleural furrows thin, distinct; posterior bands of ribs narrower and lower than the anterior ones; they are shorter (*tr.*) than anterior bands, as a result, the adaxial end of ribs consists exclusively of posterior bands, which are here distinctly broadened (*exsag.*); pleural field postaxially is somewhat swollen, and individual ribs are unrecognizable.

In longitudinal section, axis straight, very weakly inclined backwards, postaxial field vaulted and steeply placed, border horizontal.

In transverse section, axis and pleural lobes moderately vaulted.

Ornamentation of exoskeleton in the form of a dense and prominent tuberculation; tubercles of different size, pointed; they are smaller and lower on frontal lobe of glabella, and smaller, but also pointed along the marginal part of cephalon. Just before the anterior tips of eyes there is a pair of tubercles, symmetrically placed, larger than another pair of tubercles, situated anteriorly to the preglabellar furrow. Along the outer margin of palpebral lobe, and on the palpebral lobe itself, occur also somewhat larger tubercles. Tubercles covering pygidium are somewhat more pointed, of different size, those on the anterior band of rib being generally larger and continuing to the very margin of pygidium; present along the margin of pygidium are some fine tubercles. Marginal part of pygidium in prolongation of pleural furrows devoid of ornamentation. Along the top of axis there is arranged a row of more conspicuous tubercles, placed usually on every third ring.

Text — plate I

Fig. 1. *Brachymetopus ouralicus sanctacrucensis* n. subsp., holotype cephalon (Z. Pal. Tr. II. 153); Gałęzice, Holy Cross Mountains, Poland; Viséan.

Fig. 2. *Brachymetopus moelleri parvus* n. subsp., holotype cephalon (Z. Pal. Tr. II. 30); Gałęzice, Holy Cross Mountains, Poland; Viséan.

Fig. 3. *?Brachymetopus* sp., pygidium (Z. Pal. Tr. II. 150); Gałęzice, Holy Cross Mountains, Poland; Viséan.

Fig. 4. *Brachymetopus ouralicus sanctacrucensis* n. subsp., pygidium (Z. Pal. Tr. II. 99); Gałęzice, Holy Mountains, Poland; Viséan.

Fig. 5. *Brachymetopus ouralicus ouralicus* (de Verneuil), neotype pygidium (TML 2022/5107); Shartymka river, South Urals, USSR; Viséan.

Fig. 6. *Brachymetopus weberi* n. sp., pygidium (TML 2065 a/5107); Vaigatch Island, USSR; Upper Carboniferous.

Fig. 7. *Brachymetopus weberi* n.sp., longitudinal section of holotype cephalon (TML 2065 b/5107); Vaigatch Island, USRR; Upper Carboniferous.

Figs. 1-6: *a* transverse section, *b* longitudinal section.

Abnormalities. — It can be seen on one of the pygidia of *B. ouralicus sanctacrucensis* n. subsp. that on the right side of the axis the 8th ring is underdeveloped, shorter (*tr.*) and not reaching the axial furrow (Pl. I, Fig. 5). This abnormality is associated with some irregularity of the right pleural lobe. Between 7th and 8th segment there runs a short, transverse furrow, devoid of any ornamentation, which cuts off the ends of 7th and 8th rib, which together form the rounded swelling. The fact that 8th ring as well as 7th and 8th rib are abnormal, may indicate that the damage was deep, reaching to the soft body, and that it took place early during the life of the animal, when the ribs were still opposite the proper rings, and there was no disparity between them.

Remarks. — The here described *Brachymetopus ouralicus sanctacrucensis* n. subsp. is close both to the nominate subspecies and to *B. ouralicus ornatus* Woodward, 1884. It is similar to *B. ouralicus ouralicus* in having dense ornamentation, with a row of larger tubercles along the middle line of pygidial axis, which also has about 20 rings. It differs, however, from this subspecies in having a triangular outline of cephalon, upturned anterior border, steeply sloping preglabellar field, broader pygidium with a more concave margin, and tubercles on cephalon conspicuous, these adjoining the preglabellar furrow and eyes being larger. The ornamentation of pygidium is also slightly differently pronounced, the tubercles on the pygidial margin occurring only in the prolongation of the ribs, the area in the prolongation of the pleural furrows being devoid of any ornamentation.

With *B. ouralicus ornatus,* the new subspecies has in common its subtriangular shape, and raised anterior border, which is, however, in *B. ouralicus sanctacrucensis* n. subsp. still much more upturned. In the latter subspecies, the preglabellar field is more strongly declined in the part adjoining the glabella, and the pygidium is broader with a longer axis. Though larger tubercles before the glabella and eyes occur in both subspecies, nevertheless, the granulation in *B. ouralicus sanctacrucensis* is denser. The pattern of ornamentation of pygidia in both subspecies is the same.

Stratigraphic and geographic range. — Type horizon and type locality.

Brachymetopus moelleri parvus n. subsp.
(Pl. II, Fig. 3; Text-Pl. I, Fig. 2)

Holotype: Cephalon (Z. Pal. No. Tr. II/30); Pl. II, Fig. 3.

Type locality: Besówka Hill, Gałęzice, Holy Cross Mountains, Poland.

Type horizon: D_2, Viséan, Lower Carboniferous.

Derivation of the name: Lat. *parvus* — because of the small size of holotype cephalon.

Diagnosis. — Outline of cephalon rounded; glabella longer than wide; cephalic border with double row of tubercles, separated from the rest of cephalon by a smooth band; double row of tubercles along the occipital ring.

Material. — One holotype cephalon, 2 fragments of external moulds of other cephala, from light limestone of Besówka Hill, Gałęzice.

Dimensions (in mm):

	Z. Pal. No. Tr. II/30
Length of cephalon	5.0
Width of cephalon	9.6
Length of glabella	2.5
Width of glabella	2.0

Description. — Cephalon broadly rounded frontally, without genal spines; cephalic border flat, separated from the rest of cephalon by a smooth, unornamented band; glabella comparatively slender, longer than wide; basal lobe extremely small, nearly obsolete; eye very close to glabella.

In longitudinal section, occipital ring convex, occipital furrow broad, frontal part of glabella inclined downwards, preglabellar field steeply sloping, convex, anterior border flat, horizontal.

In transverse section, glabella moderately convex, palpebral lobes steeply raised, eyes very convex, vertically situated, librigena steeply inclined downwards.

Hypostoma, thorax and pygidium unknown.

Ornamentation very dense, in the form of rounded tubercles of different size. Along the cephalic border, two irregular rows of granules present, these in marginal row much smaller; the two biggest tubercles placed in front of eyes, another pair at frontal furrow; along the mid-line of glabella 2-3 somewhat larger tubercles; palpebral lobes comparatively coarsely granulated.

Remarks. — The cephalon of *Brachymetopus moelleri parvus* n. subsp. is most close to *B. moelleri thuringensis* Hahn, 1964 from the "*Pericyclus*--Stufe" (?Tournaisian) of Germany. Both subspecies have, in contrast to the nominate subspecies, a cephalon rounded in the front, and a border separated by a smooth band. The cephalon here described is different from *B. moelleri thuringensis* in having less rounded genal angles, more slender glabella, much less developed basal lobes and denser granulation. In all these characters it is similar to the nominate subspecies. Additionally, the here described new subspecies differs from the Thuringian representative in having a double row of tubercles along the border and occipital ring, instead of a singular row as in the other subspecies. A significant difference is also observed in the position of the eyes and palpebral lobes in both compared subspecies. In *B. moelleri thuringensis* the eyes are fur-

ther from the glabella, and the palpebral lobes less steeply raising, which makes them seem broader when viewed from the top.

Stratigraphic and geographic range. — Type horizon and type locality.

Brachymetopus weberi n. sp.

(Pl. II, Figs. 4, 7; Text-Pl. I, Figs. 6, 7)

1937. *Brachymetopus moelleri* n. nom.(?); V. N. Weber, Kamennougolnye trilobity..., p. 140 (footnote), Text-fig. 68c.

non 1937. *Brachymetopus moelleri* n. nom.(?); V. N. Weber, *ibid.*, p. 84, Pl. 10, Figs. 10, 11; Text-fig. 68b.

Holotype: Cephalon (TML No. 2065b/5107); Weber, 1937, Text-fig. 68c, our Pl. II, Fig. 4.

Type locality: Vaigatch Island, USSR.

Type horizon: (?) Gzhelian, Upper Carboniferous.

Derivation of the name: *weberi* — in honour to V. N. Weber, who first gave a description of the specimens from Vaigatch Island, which are the subject of the considerations below.

Diagnosis. — Cephalon triangular, pointed anteriorly, with rounded genal angles; cephalic border broad, broadest at mid-line, distinctly delimited; eye comparatively small, situated opposite posterior half of glabella; pygidium broad, subsemicircular, flat; axis with 20 rings; ribs separated by broad pleural furrows.

Material. — One somewhat damaged internal mould of cephalon, 9 pygidia from type horizon and locality.

Dimensions (in mm):

	TML No. 2065b	TML No. 2065a
Length of cephalon	6.0	—
Width of cephalon	12.0(?)	—
Length of glabella	3.5	—
Width of glabella	3.3(?)	—
Length of pygidium	—	9.2
Width of pygidium	—	11.0
Length of axis	—	8.8
Width of axis	—	4.0

Description. — Cephalon triangular, distinctly pointed in front, without genal spines; cephalic border broadest anteriorly where it is flat, becoming narrower and convex outwards; border furrow broad, concave, poorly defined frontally; glabella subcylindrical, with small basal lobes; eyes small, opposite the posterior half of glabella.

In longitudinal section, cephalon strongly vaulted, anterior border flat, horizontal, preglabellar field raising nearly vertically backwards.

In transverse section, genal region strongly vaulted.

Hypostoma and thorax unknown.

Pygidium subsemicircular, broad and comparatively flat; pygidial border not differentiated; axis slender, long, with 20 rings; 8 ribs very well separated by broad (*ex sag.*) pleural furrows, which widen outwards, but do not reach margin of pygidium, the ribs merging along the latter, forming a kind of border; posterior bands of ribs very thin, merging with pleural furrows.

In longitudinal section, axis gently sloping backwards, indistinctly delimited at tip.

In transverse section, axis vaulted, pleural lobes gently sloping.

Ornamentation of cephalon granular, dense, border furrow smooth, tubercles along the border, irregularly spaced; pygidium granulated, along the middle line, on every third axial ring a more prominent tubercle is placed.

Remarks. — The cephalon of *Brachymetopus weberi* n. sp. is very similar to the cephalon of *B. moelleri moelleri* Weber, 1937 in its rounded genal angles and strong vaulting. It was tentatively assigned within *Brachymetopus moelleri* by Weber (1937). However, the structure of the anterior border, which is flat and pointed frontally, is not found in any known Carboniferous representative of *Brachymetopus*. The borders in all the three known subspecies of *B. moelleri* are band-like and equal in width along the whole cephalon.

The pygidium of *B. weberi* n. sp. is somewhat similar in its broad shape and long axis to the pygidia within *B. ouralicus* (de Verneuil, 1845), it is however different in the structure of ribs, with obsoleting posterior bands and broad pleural furrows separating successive ribs. In this character it resembles somewhat *B. maccoyi* (Portlock).

The specimens of *B. weberi* n. sp. were found together with *"Griffithides gruenewaldti"* (Moeller, 1867), which seems to be and index fossil for the Gzhelian stage.

Brachymetopus n. sp.
(Pl. II, Fig. 5)

Material. — One damaged cephalon (TML No. 2075/5107) from the light grey limestone of the Altai, Bukhtarma series, Tournaisian, USSR.

Dimensions (in mm):

	TML No. 2075/5107
Length of cephalon	4.0
Length of glabella	2.0
Width of glabella	1.8

Remarks. — The small cephalon in Weber's collection is too fragmentary to become a subject of valid taxon. It is, however, a very interesting specimen and, without doubt, represents a new species. In the subcylin-

drical shape of the glabella, its strong vaulting, as well as in the deepness and significant width of the border furrow, and strong genal spines, it is close to *Brachymetopus strzeleckii uralicus* Weber, 1937. It has, however, larger eyes and less developed basal lobes than the latter subspecies. The most unusual character of this cephalon, so far never found in any *Brachymetopus* species, is its ornamentation. It consists of very thick and prominent tubercles, which cover the cephalon, excluding the border which is deeply pitted.

?Brachymetopus sp.
(Pl. II, Fig. 2; Text-Pl. I, Fig. 3)

Material. — Three pygidia from the light Viséan limestone of Besówka Hill, Gałęzice, Holy Cross Mountains, Poland.

Dimensions (in mm):

	Z. Pal. No. Tr. II/50
Length of pygidium	5.8
Width of pygidium	7.0
Length of axis	4.8
Width of axis	2.3

Description. — Pygidium rounded, slightly broader than long, marginal part of pygidium thickened and convex, but no distinct border developed; axis faintly narrowing backwards, with bluntly rounded tip; 12-13 axial rings, ring-furrows deep and comparatively broad (*sag.*); on pleural lobe 8 thick ribs, their posterior bands discernible only in the first three ribs, but even there strongly overgrown by anterior bands; pleural furrows deep, widening (*exsag.*) outwards.

In longitudinal section, axis slightly arched, more strongly inclined in its posterior part, postaxial region sloping at about an angle of 45°.

In transverse section, axis convex, pleural robes vaulted, steeply sloping outwards.

Ornamentation in the form of very high and rounded granules, which are smaller and lower on the marginal part of pygidium.

Remarks. — The described pygidia are tentatively assigned to the genus *Brachymetopus,* because they differ very significantly from all known species of this genus, in having very short axis, and a somewhat convex marginal part. On the other hand, the arrangement of ribs is typical for *Brachymetopus,* as well as the ornamentation which consists of rounded granules.

In the same beds, the cephala of *B. moelleri parvus* n. subsp. were found, and the pygidia in question may represent the same subspecies. However, they differ very strongly from the pygidia, assigned by Hahn (1964) to *B. moelleri thuringensis* Hahn, 1964.

Another possibility exists that the pygidia here described may represent the genus "*Metaphillipsia*" Reed, 1943 (the genus will be revised in

the near future). Some of the known representatives of this genus have similarly vaulted pygidia, with a convex margin and a comparatively short axis. The arrangement of the ribs is, nevertheless, different in these forms. They do not slant so strongly backwards in the "*Metaphillipsia*" — species, and their ornamentation is more regular, the tubercles being always conspicuous, or spinelike, arranged into longitudinal rows. These characters have not been detected on the above described pygidia.

Palaeozoological Institute
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Warszawa, Żwirki i Wigury 93
April, 1968

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HALSZKA OSMÓLSKA

BRACHYMETOPUS McCOY (TRILOBITA) Z KARBONU POLSKI I Z.S.R.R.

Streszczenie

Materiał opisany w niniejszej pracy pochodzi z dolnego karbonu Polski (turnej regionu krakowskiego, wizen D_2 Gór Świętokrzyskich) oraz z dolnego i górnego karbonu Z.S.R.R. (Ural, Donbas, Turkiestan, Ałtaj, Nowa Ziemia). Obejmuje on następujące gatunki i podgatunki: *Brachymetopus maccoyi maccoyi* (Portlock, 1843),

B. weberi n. sp., *B. ouralicus sanctacrucensis* n. subsp., *B. moelleri parvus* n. subsp. Opisane również zostały: cefalon o nieustalonej przynależności gatunkowej — *Brachymetopus* n. sp. oraz pygidium, którego zaliczenie do rodzaju *Brachymetopus* nie jest pewne — *?Brachymetopus* sp.

Ponadto w pracy niniejszej przeprowadzono rewizję szeroko rozprzestrzenionego geograficznie gatunku *Brachymetopus ouralicus* (de Verneuil, 1845), obejmującego 4 podgatunki, dla których podano tu diagnozy i rozprzestrzenienie: *B. ouralicus ouralicus* (de Verneuil, 1845), *B. ouralicus ornatus* Woodward, 1884, *B. ouralicus inflatus* Weber, 1937 oraz wymieniony wyżej *B. ouralicus sanctacrucensis* n. subsp.

ГАЛЬШКА ОСМУЛЬСКА

BRACHYMETOPUS McCOY (TRILOBITA) ИЗ КАРБОНА ПОЛЬШИ и СССР

Резюме

Описанный в настоящей работе материал происходит из нижнего карбона Польши (турне Краковского района, визе D_2 Свентокржиских Гор), и из нижнего и верхнего карбона СССР (Урал, Донбасс, Туркестан, Алтай, Новая Земля). Включает он следующие виды и подвиды: *Brachymetopus maccoyi maccoyi* (Portlock, 1843), *B. weberi* n. sp., *B. ouralicus sanctacrucensis* n. subsp., *B. moelleri parvus* n. subsp. Описано также: цефалон о неопределенной видовой принадлежности — *Brachymetopus* n. sp. и пигидиум, причисление которого к роду *Brachymetopus* недостаточно уверено — ? *Brachymetopus* sp.

Кроме этого, в настоящей работе проведено ревизию широко географически распространенного вида *Brachymetopus ouralicus* (de Verneuil, 1845), включающего 4 подвида, для которых приведено их диагнозы и распространение: *B. ouralicus ouralicus* (de Verneuil, 1845), *B. ouralicus ornatus* Woodward, 1884, *B. ouralicus inflatus* Weber, 1937, а также вышеупомянутый *B. ouralicus sanctacrucensis* n. subsp.

PLATES

Plate I

Brachymetopus ouralicus sanctacrucensis n. subsp.

Fig. 1. Librigena (Z. Pal. No. Tr. II/14); × 6.

Fig. 2. Pygidium of small specimen (Z. Pal. No. Tr. II/38); × 6.

Fig. 3. Holotype cephalon (Z. Pal. No. Tr. II/153); × 6.

Fig. 4. Pygidium (Z. Pal. No. Tr. II/108); × 6.

Fig. 5. Pygidium (Z. Pal. No. Tr. II/99); × 6.

Brachymetopus ouralicus ouralicus (de Verneuil)

Fig. 6. Neotype pygidium (TML No. 2022/5107); × 4.6.

Fig. 7. Pygidium (TML No. 2021/5107); × 5.2.

Figs. 1-5: Viséan; Gałęzice, Holy Cross Mountains, Poland.

Fig. 6: Viséan; Shartymka river, South Urals, USSR.

Fig. 7: Viséan; Western Slope of Urals, USSR.

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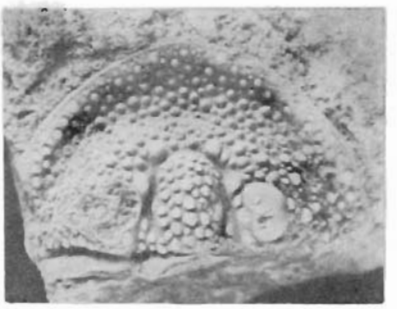

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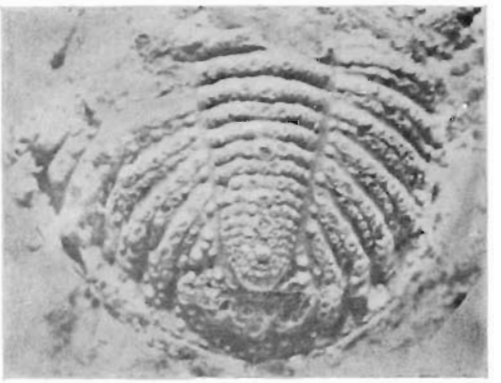

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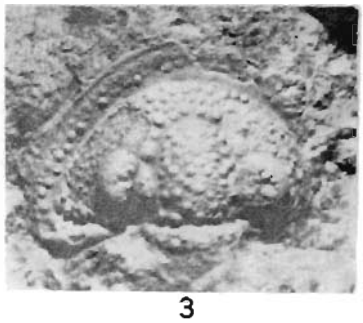

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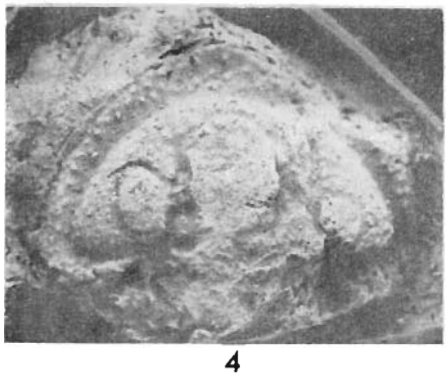

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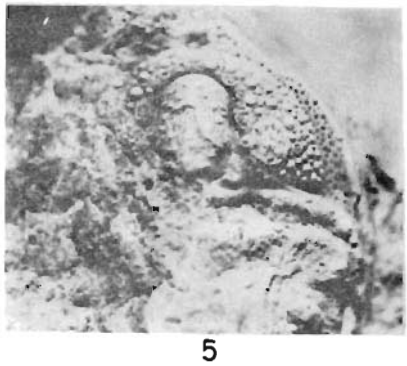

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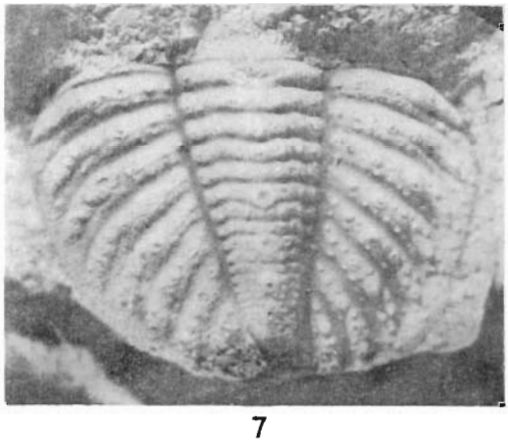

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Plate II

Brachymetopus maccoyi maccoyi (Portlock)

Fig. 1. Cephalon (ZNG Kr. 0.1); × 6.

Fig. 6. Pygidium (ZNG Kr. 0.2); × 5.

?Brachymetopus sp.

Fig. 2. Pygidium (Z. Pal. No. Tr. II/150); × 5 .

Brachymetopus moelleri parvus n. subsp.

Fig. 3. Holotype cephalon (Z. Pal. No. Tr. II/30); × 5.4.

Brachymetopus weberi n. sp.

Fig. 4. Holotype cephalon (TML No. 2065 b/5107); × 6.

Fig. 7. Pygidium (TML No. 2065 a/5107); × 5.5.

Brachymetopus n. sp.

Fig. 5. Cephalon (TML No. 2075/5107); × 6.

Figs. 1,6: Tournaisian; Racławka rivier, Cracow region, Poland.

Figs. 2,3: Viséan; Gałęzice, Holy Cross Mountains, Poland.

Figs. 4,7: Upper Carboniferous; Vaigatch Island, USSR.

Fig. 5. Tournaisian; Altai range, USSR.